

1 1. A method comprising:
2 forming an arrayed waveguide grating including an
3 output slab waveguide coupled to a pair of output
4 waveguides coupled to a directional coupler.

1 2. The method of claim 1, including coupling a
2 directional coupler to said output slab waveguide and
3 coupling a pair of first and second output waveguides
4 between said output slab waveguide and directional coupler.

1 3. The method of claim 2 including making the
2 primary channel spacing between paired first and second
3 waveguides coupled to the same coupler different than the
4 secondary channel spacing between the first waveguides
5 coupled to different but adjacent couplers.

1 4. The method of claim 3 including making the
2 secondary channel spacing greater than the primary channel
3 spacing.

1 5. The method of claim 1, including forming the
2 pairs of waveguides with a length difference of
3 approximately $(2m+1)\lambda_c/4n_{\text{eff}}$, where m is an integer, λ_c is
4 the average center wavelength, and n_{eff} is the effective
5 refractive index of the waveguides.

1 6. The method of claim 1 including forming said
2 grating on a planar light circuit.

1 7. The method of claim 1 including creating output
2 signals having a flat spectral shape.

1 8. An arrayed waveguide grating comprising:
2 an input and an output waveguide;
3 a waveguide array;
4 an output slab waveguide coupled to said array
5 and said output waveguides; and
6 a directional coupler coupled to two output
7 waveguides also coupled to said slab waveguide.

1 9. The grating of claim 8 wherein said output
2 waveguides coupled to the same coupler have a length
3 difference of approximately $(2m+1)\lambda_c/4n_{\text{eff}}$, where m is an
4 integer, λ_c is the average center wavelength, and n_{eff} is the
5 effective refractive index of the two successive
6 waveguides.

1 10. The grating of claim 8 wherein said grating is
2 formed on a planar light circuit.

1 11. The grating of claim 8 wherein said grating
2 creates output signals having a flat spectral shape.

1 12. The grating of claim 8 wherein said grating is a
2 multiplexer.

1 13. The grating of claim 8 wherein said grating is a
2 demultiplexer.

1 14. The grating of claim 8 including a directional
2 coupler, which is coupled by a first and a second output
3 waveguide to said output slab waveguide.

1 15. The grating of claim 14 wherein a primary channel
2 spacing between output waveguides coupled to the first
3 directional coupler is less than a secondary channel
4 spacing between a first output waveguide coupled to a first
5 directional coupler and a first output waveguide coupled to
6 a second directional coupler.

1 16. The grating of claim 15 wherein the primary
2 channel spacing is about one quarter of the secondary
3 channel spacing.

1 17. A method comprising:
2 filtering a signal using an arrayed waveguide
3 grating; and
4 adjusting the spacing between successive
5 waveguides to generate a flat spectral output wave form.

1 18. The method of claim 17 including forming an
2 arrayed waveguide grating having an output waveguide
3 coupler coupled to a pair of output waveguides having a
4 length difference of approximately $(2m+1)\lambda_c/4n_{eff}$, where m is
5 an integer, λ_c is the average center wavelength, and n_{eff} is
6 the effective refractive index of the two successive
7 waveguides.

1 19. The method of claim 17 including forming the
2 grating on a planar light circuit.

1 20. The method of claim 17 including forming a
2 demultiplexer.

1 21. The method of claim 17 including forming a
2 multiplexer.

1 22. An optical filter comprising:
2 an input and output waveguide coupler; and
3 a waveguide pair coupled to said output waveguide
4 coupler, said waveguide pair having a length difference
5 such that a flat spectral output signal is produced.

1 23. The method of claim 22 including forming said
2 pair having a length difference of approximately
3 $(2m+1)\lambda_c/4n_{eff}$, where m is an integer, λ_c is the average

4 center wavelength, and n_{eff} is the effective refractive
5 index of the two successive waveguides.

1 24. The filter of claim 23 wherein said filter is a
2 demultiplexer.

1 25. The filter of claim 23 wherein said filter is a
2 multiplexer.

1 26. The filter of claim 22 wherein said filter is
2 formed as a planar light circuit.

1 27. The filter of claim 22 including a directional
2 coupler coupled to said pair.

1 28. The filter of claim 22 including a plurality of
2 waveguide pairs coupled to said output waveguide coupler.

1 29. A method comprising:
2 forming an arrayed waveguide grating including an
3 output slab waveguide coupled to a first and second output
4 waveguide coupled to a multi-mode interference coupler.

1 30. The method of claim 29 including coupling a
2 multi-mode interference coupler to said output slab
3 waveguides and coupling the first and second output

4 waveguides between said output slab waveguide and said
5 multi-mode interference coupler.

1 31. The method of claim 30 including making the
2 primary channel spacing between the first and second
3 waveguides coupled to the same coupler different than the
4 secondary channel spacing between the first and a third
5 waveguide coupled to different but adjacent couplers.

1 32. The method of claim 31 including making the
2 secondary channel spacing greater than the primary channel
3 spacing.

1 33. An arrayed waveguide grating comprising:
2 a waveguide array;
3 an output slab waveguide coupled to said array;
4 and
5 a multi-mode interference coupler coupled to a
6 first and a second output waveguide also coupled to said
7 slab waveguide.

1 34. The grating of claim 33 including a pair of
2 multi-mode interference couplers, one coupler coupled to
3 the first and second output waveguides, a third and fourth
4 output waveguides, the other coupler coupled to said third
5 and fourth output waveguides.

1 35. The grating of claim 34 wherein a primary channel
2 spacing between the first and second output waveguides is
3 less than a secondary channel spacing between the first
4 output waveguide and the third output waveguide.